

1 Selective One-Way Bit-Driving Apparatus

3 **Field of Invention**

4 The present invention relates to a selective one-way bit-driving apparatus.

6 **Background of Invention**

7 Referring to Figure 10, a conventional selective one-way bit-driving
8 apparatus 70 is provided between a handle 72 and a bit 74. The
9 selective one-way bit-driving apparatus 70 includes a hollow shaft 76 and
10 a bit receiver 78. The hollow shaft 76 includes a first section for
11 connection with the handle and a second section. The bit receiver 78
12 includes a first space for receiving the second section of the hollow shaft
13 76 and a second space for receiving the bit 74. The hollow shaft 76
14 drives the bit receiver 78 in selective one of two directions through two
15 selective one-way drivers 80. A detent 82 is installed on the second
16 section of the hollow shaft 76. A switch 84 in the form of a ring is
17 provided around the first section of the hollow shaft 76. The switch 84
18 includes two recesses 86 in an internal face in order to receive the
19 selective one-way drivers 88. Moreover, the switch 84 includes, in the
20 internal face, three recesses 88 selective one of which receives the detent
21 82 in order to keep the switch 84 in selective one of three positions on the
22 second section of the hollow shaft 76. A bolt 90 is driven into a central
23 hole in the bit receiver 78 through a tunnel of the hollow shaft 76 so as to
24 connect the hollow shaft 76 with the bit receiver 78. The bolt 90 is
25 inadequate in holding the hollow shaft 76 to the bit receiver 78. The
26 bolt 90 may be twisted and broken so as to leave a portion of the bolt 90

1 in the central hole of the bit receiver 78 that renders the bit receiver 78
2 useless. The first space of the bit receiver 78 is isolated from the tunnel
3 of the hollow shaft 76 so that the selective one-way bit-driving apparatus
4 70 cannot be used with a bit with two operative ends that bit requires a
5 long tunnel.

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7 The present invention is therefore intended to obviate or at least alleviate
8 the problems encountered in prior art.

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10 **Summary of Invention**

11 It is an objective of the present invention to provide a selective one-way
12 bit-driving apparatus that can be assembled and dismantled easily for
13 maintenance and replacement of parts.

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15 It is another objective of the present invention to provide a selective
16 one-way bit-driving apparatus that is useful for receiving a bit with two
17 operative ends.

18

19 According to the present invention, a selective one-way bit-driving
20 apparatus is provided between a handle and a bit. The selective one-way
21 bit-driving apparatus includes a hollow shaft and a bit receiver. The
22 hollow shaft includes a first section for connection with the handle and a
23 second section. The bit receiver includes a first space for receiving the
24 second section of the hollow shaft and a second space for receiving the bit.
25 The hollow shaft drives the bit receiver in selective one of two directions
26 through a selective one-way driver. At least one connector connects the

1 wall of the first space of the bit receiver with the periphery of the second
2 section of the hollow shaft.

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4 Other objects, advantages and novel features of the invention will become
5 more apparent from the following detailed description in conjunction
6 with the attached drawings.

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8 **Brief Description of Drawings**

9 The present invention will be described via detailed illustration of two
10 embodiments referring to the drawings.

11

12 Figure 1 is a perspective view of a selective one-way bit-driving
13 apparatus according to a first embodiment of the present invention.

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15 Figure 2 is an exploded view of the selective one-way bit-driving
16 apparatus shown in Figure 1.

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18 Figure 3 is a cross-sectional view of a portion of the selective one-way
19 bit-driving apparatus shown in Figure 1.

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21 Figure 4 is a top view of the portion of the selective one-way bit-driving
22 apparatus of Figure 3.

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24 Figure 5 is a left side view of the selective one-way bit-driving apparatus
25 shown in Figure 1.

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1 Figure 6 is a cross-sectional view of the selective one-way bit-driving
2 apparatus taken along a line 6-6 in Figure 1.

3

4 Figure 7 is similar to Figure 5 but shows the selective one-way bit-driving
5 apparatus in a different position.

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7 Figure 8 is a cross-sectional view of the selective one-way bit-driving
8 apparatus taken along a line 8-8 in Figure 7.

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10 Figure 9 is similar to Figure 8 but shows a selective one-way bit-driving
11 apparatus according to a second embodiment of the present invention.

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13 Figure 10 is an exploded view of a conventional selective one-way
14 bit-driving apparatus.

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16 **Detailed Description of Embodiments**

17 Referring to Figure 1, according to a first embodiment of the present
18 invention, a selective one-way bit-driving apparatus 10 is provided to
19 encompass a bit with two operative ends.

20

21 Referring to Figure 2, the selective one-way bit-driving apparatus 10
22 includes a hollow shaft 20 for connection with a handle (not shown), a bit
23 receiver 30 for receiving a bit (not shown), a selective one-way driver 24
24 through which the hollow shaft 20 drives the bit receiver 30 in selective
25 one of two directions, two connectors 40 for connecting the bit receiver
26 30 with the hollow shaft 20, a restraint 50 for restraining the connectors

1 40 and a lock 60 for locking the restraint 50 to the hollow shaft 20.

2

3 The hollow shaft 20 includes a first section 21 and a second section 22
4 with an external diameter greater than that of the first section 21. Four
5 rows of teeth and preferably ratchets 23 are formed on the first section 21.
6 As the first section 21 is put in the handle, the teeth 23 hold the first
7 section 21 to the handle. Moreover, the teeth 23 cooperate with the lock
8 60 in a manner to be described. Two T-shaped cavities 25 and two
9 cavities 27 are defined in the second section 22 so that each T-shaped
10 cavity 25 is communicated with a related cavity 27. The cavities 27 are
11 deeper than the T-shaped cavities 25 for a reason to be described. As a
12 hollow element, the hollow shaft 20 defines an axial tunnel 26.

13

14 The bit receiver 30 includes a first section 31 and a second section 32.
15 The first section 31 defines a space 33. The second section 32 defines a
16 space 36 communicated with the space 33. Teeth 34 are formed on an
17 internal face of the first section 31. An annular groove 35 is defined in
18 the internal face of the first section 31. A spring 37 is provided in the
19 space 33.

20

21 The selective one-way driver 24 is installed on the second section 22.
22 As the second section 22 of the hollow shaft 20 is put in the first section
23 31 of the bit receiver 30, the selective one-way driver 24 is engaged with
24 the teeth 34.

25

26 Each connector 40 includes a body, a T-shaped head 41 extending from

1 the body in a same plane and a bent tail 42 projecting from the body in a
2 perpendicular plane. Referring to Figure 4, the T-shaped head 41 of
3 each connector 40 is put in a related T-shaped cavity 25 so that the bent
4 tail 42 is put in a related cavity 27.

5

6 Referring to Figure 3, the bent tail 42 of one connector 40 is put deep in a
7 related cavity 27 so that it is outside the annular groove 35 and that the
8 T-shaped head 41 is outside a related T-shaped cavity 27. The bent tail
9 the bent tail 42 of the other connector 40 is put in the annular groove 35
10 so that the T-shaped head 41 is in a related T-shaped cavity 27.

11

12 When the bent tail 42 of each connector 40 is outside the annular groove
13 35 and the T-shaped head 41 is outside a related T-shaped cavity 27, the
14 second section 22 of the hollow shaft 20 can be moved from the first
15 section 31 of the bit receiver 30. On the contrary, when the bent tail 42
16 of each connector 40 is in the annular groove 35 and the T-shaped head
17 41 is in a related T-shaped cavity 27, the second section 22 of the hollow
18 shaft 20 is locked to the first section 31 of the bit receiver 30.

19

20 Referring to Figure 2, the ring 50 is in the form of a ring that can be put
21 around the second section 22 of the hollow shaft 20. The lock 60 is in
22 the form of a washer, i.e., it defines a central hole 61 for receiving the
23 first section 21 of the hollow shaft 20. Moreover, the lock 60 defines
24 four recesses 62 for receiving the rows of the teeth 23. The lock 60
25 includes a mark 63 for indication of the direction in which the lock 60
26 should be rotated in order to lock.

1 Referring to Figures 5 and 6, the ring 50 is put around the second section
2 22 of the hollow shaft 20. The T-shaped heads 41 of the connectors 40
3 are restrained in the T-shaped cavities 25 by means of the restraint 50.
4 The bent tails 42 of the connectors 40 are restrained in the cavities 27
5 accordingly. The central hole 61 of the lock 60 is aligned with the first
6 section 21 of the hollow shaft 20 and the recesses 62 are aligned with the
7 rows of teeth 23 so that the lock 60 can be put around the first section 21
8 of the hollow shaft 20.

9

10 Referring to Figures 7 and 8, the lock 60 is rotated so that the recesses 62
11 are not aligned with the rows of teeth 23 so that the lock 60 is restrained
12 around the first section 21 of the hollow shaft 20 by means of the rows of
13 teeth 23.

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15 Figure 9 shows a selective one-way bit-driving apparatus according to a
16 second embodiment of the present invention. The second embodiment
17 is identical to the first embodiment except that the space 33 of the bit
18 receiver 30 is not communicated with the space 36. Thus, as the second
19 section 22 of the hollow shaft 20 is put in the first section 31 of the bit
20 receiver 30, the axial tunnel 26 of the hollow shaft 20 is not
21 communicated with the space 36 of the bit receiver 30.

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23 Both the first and second embodiments of the present invention can be
24 assembled and dismantled easily for maintenance and replacement of
25 parts. The first embodiment is useful for receiving the bit with two
26 operative ends due to the axial tunnel 26 of the hollow shaft 20

1 communicated with the space 36 of the bit receiver 30.

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3 The present invention has been described via detailed illustration of the
4 embodiments. Those skilled in the art can derive variations from the
5 embodiments without departing from the scope of the present invention.

6 Therefore, the embodiments shall not limit the scope of the present
7 invention that is defined in the claims.

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